

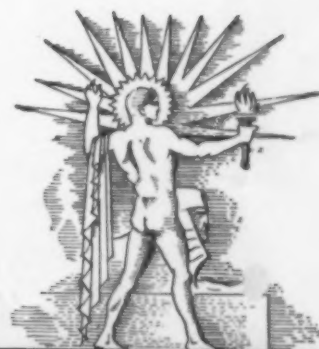
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JUN 30 1933

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE.



JUNE 24, 1933

Black Lightning

See Page 390

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Summary of Science

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DO YOU KNOW?

A Brooklyn bakery is using radio wave heat to bake crustless bread.

Hay fever is not caused by hay, and fever is not a symptom.

Wild sheep do not grow wool, but have straight, coarse hair like that of deer.

A 1,200-mile pipe line is being constructed across the Syrian desert, to carry oil from Iraq to Mediterranean ports.

The state having the greatest number of horses on farms is Iowa, where the horse census shows more than a million.

A new molded plastic material of superior toughness is expected to prove useful for golf club heads, fishing reels, and other articles that get hard use.

France's latest contribution to the "vest-pocket" automobile is a five horsepower, two-passenger cabriolet having a wheelbase of little more than six feet.

Chickens first became known outside their native homes in India when Persian roads made it convenient to carry Indian fowl to the Aegean countries.

A new machine can fill toothpaste tubes at the speed of 140 a minute.

Pure nickel, used in coins in 23 countries, is more difficult to counterfeit than copper-nickel.

A bacteriologist recently received a prize for work showing that bacterial causes of goiter do not exist.

The eyes of a giraffe are said to be larger and more gentle and lustrous than the famous eyes of the gazelle.

Goggles with transparent side pieces are being produced for industrial workers, with a view to eliminating the "blinder" feeling which bothers some workers.

It is estimated that 73 out of every 100 men who enter a store to buy a suit of clothes actually buy a suit; whereas women customers shop with less directness.

A map of the sky made by a Syrian astronomer of the twelfth century shows that the East knew that the earth was smaller than several other planets long before Europe had such advanced knowledge.

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BACTERIOLOGY

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CHEMISTRY

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What are ideal grasshopper hatching grounds? p. 392. *Destructive and Useful Insects*—C. L. Metcalf and W. P. Flint—McGraw-Hill, 1928, \$7.50.

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Why do women age more quickly than men? p. 387.

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Upon what authority do physicians become specialists now? p. 394.

SOCIOLOGY

Why are people marrying younger now? p. 388.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in the United States.

PHYSIOLOGY

Gland's Past Influence Told From Condition of Skull

X-ray Photographs of Skull Changes Studied to Learn About Health and Physical and Mental Development

SKULL change is a new key to the past function of the gland which influences growth, sexual development and possible mentality. Studies showing this were reported by Dr. Hector Mortimer of Boston to the Association for the Study of Internal Secretions.

It appeared from Dr. Mortimer's report that the history of the functioning of an individual's pituitary gland throughout his life with all that tells of the individual's health and physical and mental development, can be read in changes in his skull that may be seen in X-ray photographs.

Four basic types of skull change were found by Dr. Mortimer and Drs. George Levene and Allen Winter Rowe of Boston after reviewing a collection of documented acromegalic crania in museums in America, England, and Scotland.

The first type is characterized by expansion of the face and sinuses, especially the frontal sinuses. This expansion changed, affecting all bones and mechanically producing the well-known deformities of acromegaly including the large jaws.

The second type is characterized by a small head, small face and very dense skull. This chiefly affects women, who are usually fat, and is a sign of failure of the gland, not of over-activity as in the first type.

The third type begins as a type one, with over-active gland; the gland subsequently fails and the bones become dense like old bones, even in young people of eighteen.

Failure of the gland is in other words premature aging of the individual. The skull becoming dense, which means not that it is thick but that it is so compact as to be almost like ivory, is an indication of failure of the gland. This is a feature of both groups two and three. In these groups there are ten times as many women as men. The mechanism behind all this accounts for women's ageing more quickly than men and being more liable to get stout.

The fourth type of skull change is

found in dwarfs and other persons whose pituitary gland has never been fully active. This type can be recognized by failure of the frontal and other sinuses to develop completely. In many of these persons the frontal sinuses never develop at all. This gland failure also means that the sexual development is below par or even absent.

Dr. Mortimer showed a well-known family of four dwarfs who have played in the movies. The second eldest, tallest of the family with her four feet two inches of height, had grown an inch in this last year. She has a trace of frontal sinus on one side. None of the others has any.

Science News Letter, June 24, 1933

METEOROLOGY

International Weather Data Would Help Forecasting

INTERNATIONAL cooperation in the exchange of weather data would help the weather man a great deal in his task of forecasting rain or shine a day or two ahead, it was indicated by a paper presented before the meeting of the Amer-

ican Meteorological Society in Chicago, by Thomas A. Blair of the U. S. Weather Bureau, Lincoln, Nebr.

"If the data were assembled promptly from the entire northern hemisphere, so as never to be over a month old, they would be of considerable value to the forecaster in connection with the daily weather maps," Mr. Blair said. "They would help him to decide on the type of weather likely to prevail in the immediate future, that is, whether the cyclones and anticyclones would follow the same paths as in the recent past, or be temporarily deflected to other paths, or show a definite and persistent change of track and character."

Science News Letter, June 24, 1933

MEDICINE

Blue Dye May Relieve Stubborn Skin Disorder

THE BLUE DYE, methylene blue, which has been successfully used to treat victims of carbon monoxide and cyanide poisoning, may also prove useful in treating cases of a stubborn skin disorder, pemphigus.

Investigations suggesting this use of the dye and confirming its usefulness in carbon monoxide and cyanide poisoning were reported by Dr. David I. Macht of Baltimore to the National Academy of Sciences. Dr. Macht's investigations were made on the growth of seedlings of *Lupinus albus*. In previous researches, Dr. Macht found that the growth of these seedlings is checked by various poisonous substances and also by human blood.

(Turn Page)



THE PRIBILOFS COME TO NEW YORK

In the new Hall of Ocean Life of the American Museum of Natural History in New York, one of the most striking groups is a family of fur seals, shown against a naturalistic background as they might be seen on the great rookery islands of the Pribilofs, far away in Alaskan waters. The group is dominated by the bulky-bodied old bull seal, surrounded by his seraglio of wives, whom he has won in open fight with the other males of the herd.

Blood which contained carbon monoxide and blood serum from patients suffering with pernicious anemia, leprosy and pemphigus also checked the growth of the seedlings. But when methylene blue was added to the blood sera, the growth-checking or toxic effect was decreased.

This suggests that the blue dye might be helpful in treating other conditions in which the blood gives a toxic reaction besides carbon monoxide poisoning. While science now has successful methods of treating pernicious anemia and leprosy, treatments for pemphigus are not satisfactory, Dr. Macht pointed out.

However, he warned that the blue dye is a very potent substance and should be used in small amounts, particularly when trying it for the first times in the treatment of disease or poisoning. Treatment of pemphigus patients with methylene blue is warranted as a result of the laboratory findings, Dr. Macht said, but such treatment has not yet been actually tried.

The botanical findings support the laboratory results of Mrs. Matilda M. Brooks of the University of California and the clinical experiences of Dr. J. C. Geiger of San Francisco relative to usefulness of methylene blue in treating victims of carbon monoxide poisoning.

Science News Letter, June 24, 1933

CHEMISTRY

Coal and Carboic Acid Make New Resin

COAL is the raw material of a new kind of artificial resin manufactured in Germany to compete with more familiar synthetic materials made from phenol and formaldehyde.

The new coal resin, trade named "Kolinit," is the invention of Dr. Franz Fischer, O. Horn and H. Küster. Dr. Fischer is one of Germany's leading chemists and director of the coal research institute at Mülheim-Ruhr.

Wood, peat, lignin and brown coal, as well as ordinary coal, can be worked into the new resin, information transmitted to the American Chemical Society indicates. In process of manufacture pulverized coal is heated with an excess of phenol or carboic acid. The cost of manufacture is said to be lower than that of competitive materials and it can be used to make buttons, dishes and large objects. The material is electrified by friction as is hard rubber.

Science News Letter, June 24, 1933

SOCIOLOGY

Marriage More Popular Today Than at Turn of Century

"Go West, Young Man," Where Women Are Scarce, Is Advice To Those Who Would Remain Bachelors

DESPITE the alarm of parents over the doings of "flaming youth," despite the relative ease of divorce, and despite the discouragement of economic conditions, a larger proportion of young people are married today than in the good old days of 1890. The figures are revealed in a newly published book by Dr. Warren S. Thompson, director of the Scripps Foundation for Research in Population Problems, and his associate P. K. Whelpton (McGraw-Hill).

Percentages Drop

Especially are bachelors rushing into the yoke of matrimony. In 1890, about 42 per cent. of the men of all ages were single, but by 1930 this percentage had dropped to 34. Among the men of the more "eligible" ages, the drop between 1890 and 1930 is even more striking—from 81 per cent. of those aged 20 to 24 down to 71 per cent., and from 46 per cent. of those aged 25 to 29 down to a mere 37 per cent.

"Go west, young man," might now be interpreted as advice to the bachelor who wishes to retain his freedom. In the West and in the Northeast, the proportion of married males is lowest. In the West this may be accounted for, the authors believe, by the fact that there girls are more scarce, and this is borne out by the fact that in this region the proportion of married women is higher, not lower, than in any other part of the country. In the Northeast there are many cities with much light industry and office work by which women may become self-supporting. Financial independence makes marriages seem less attractive for girls.

Knowledge of Birth Control

"The trend toward earlier marriage no doubt arises from a complex of social conditions," Dr. Thompson and Mr. Whelpton conclude, "but the authors wish to call attention to the fact that earlier marriage has been taking place concomitantly with the rapid spread of contraceptive information. It seems rea-

sonable to believe that young people, knowing that marriage does not necessarily involve continence, parent-hood, or abortion, are more ready to marry than they would be were they reasonably certain they would have children born at rather regular and frequent intervals if they do not practice continence or abortion.

"The relation between early marriage and the spread of contraceptive information seems all the more likely in view of the fact that a growing proportion of the population live in the cities where the raising of a large family is not to be lightly undertaken."

Science News Letter, June 24, 1933

ARCHAEOLOGY

Authors of Old World Civilization Sought

ABELIEF that highlanders from the north moved down to Mesopotamia to start off the great pageant of ancient civilization there was expressed by Prof. E. A. Speiser of the University of Pennsylvania in an address before the American Association for the Advancement of Science.

Eagerness of science to identify those mysterious pioneer settlers whose civilization led to the glories of Nineveh, Ur, and Babylon is no mere academic curiosity, Prof. Speiser explained. By tracing Near Eastern civilization to its source, pre-historians are at the same time taking the most direct route to find the source of civilization of today. The modern world acknowledges its debt to Greece and Rome. But in their turn Greece and Rome borrowed heavily from the Near East.

The art of writing, which made historic records possible, began in this region about 3000 years before Christ. It is the unrecorded events of a millenium or two before 3000 B.C. that Dr. Speiser and two other archaeologists are endeavoring to explain. They have found pottery and other objects in no less

than 18 levels of occupation from this long prehistoric era.

In identifying the mysterious early settlers, science is having to depend almost entirely upon archaeological evidence, Prof. Speiser said. Ordinarily language is a valuable aid in tracing careers and identities of racial groups. But Mesopotamia was settled so long before writing began that nothing can be recovered of the languages of the colonists. Nor can the pre-historians derive much help from anthropological material. Comparatively few skeletal remains have been discovered. But archaeological evidence is plentiful, and while it is not the easiest thing in the world to deduce a man's racial identity by examining the contents of his wrecked home, it can be done, scholars believe.

The evidence convinces Prof. Speiser that the founders of civilization in the Near East were a people of the Alpine race who came down from the highlands between the Black Sea and the Caspian. They spread through the Valleys of the Tigris and the Euphrates and west to Syria and east to Persia.

Science News Letter, June 24, 1933



RESTORED BY ELECTRICITY

The human figure on this Greek vase was invisible beneath a forest of crystals until they were electrolytically removed and the paint redeposited on the earthenware.

ELECTROCHEMISTRY

Electric Current Untangles Salt and Paint on Old Vases

SUCCESS in the uncanny feat of using electric current to sort out a tangle of salt crusts and paint on an antique Greek vase was reported by Dr. Colin G. Fink, professor of electrochemistry at Columbia University, at the meeting of the American Association of Museums in Chicago.

Dr. Fink's success in restoring metal art objects by this method previously attracted wide attention. He has now demonstrated that antique pottery long exposed to action of salts in the earth can be returned to its original beauty by electrolysis.

When the vase was brought to his laboratory, Dr. Fink said, it had a crust of crystals of various salts directly over a human figure painted on the surface. The salt crystals had lifted the particles of black pigment entirely out of their original places.

Paint Particles Entangled

"In other words," explained Dr. Fink, "pigment particles were entangled in the little 'white forest' of crystals.

"Had we proceeded as books on restoration advocated, and used water and a brush, most of the detail of design would have been lost."

To see if the electric method could be used, Dr. Fink made preliminary tests with clay and pigments, and determined to make the experiment.

His technique with the vase depended on electrically attracting the pigments back to their original position. He did this by carefully lowering the vase into a vessel of water. Into the vase he lowered a wire, to serve as the cathode; in the water outside he placed a corresponding wire, the anode.

Walls Stop Pigments

As the water seeped into the vase through its porous clay walls, it reached the cathode wire and the circuit was closed. The pigment particles, attracted toward the cathode, of course had to stop when they reached the walls of the vase. They thus returned to the same positions whence they had been lifted by the forming salt crystals many years before.

After the pigments had been re-depos-

ited, the vase and its surrounding vessel were gradually drained. Then, while it was still slightly moist, the vase was lightly sprayed with white shellac. Then it was thoroughly dried and given two more shellac spray coats to anchor the pigments and reinforce the clay itself.

Dr. Fink believes that this method can be used for the restoration of objects made of gypsum and other porous materials as well as for clay.

Science News Letter, June 24, 1933

MEDICINE

Heat, Cold or Exertion Cause Queer Reactions

A QUEER condition of sensitivity to heat, cold, or effort was demonstrated to the American Medical Association in Milwaukee by Dr. W. W. Duke of Kansas City, Mo. He calls the condition physical allergy. The patients have many of the symptoms of sufferers from allergy due to pollens and food proteins.

One patient became frightfully depressed and was reduced to tears by warmth and exertion. With cold applications she got immediate relief from her depression and was seized with uncontrollable laughter. Another patient raised his arm three times and had convulsions. Relaxation and relief followed cold applications.

Terrific headache, asthma, partial blindness and skin eruptions were also caused by slight effort and relieved by cold applications. Temporary relief may be obtained by applying the opposite of what caused the attack. Permanent relief in many cases, amounting to cure, was obtained after six months of treatment. This consisted in applying the causative agent, heat or cold or effort as the case might be. Then just when a reaction occurred the opposite agent was quickly applied. These heroic measures, carefully applied, seemed to reaccustom the patient to the distressing factor causing the attack.

Dr. Duke also reported a case of a woman who got eczema of the face in winter. It was found to be due to fungi of firewood used in winter in her home.

Science News Letter, June 24, 1933

METEOROLOGY

Lightning

Though Much Has Been Learned About These Big Sparks of Electricity, Lightning Research Remains Almost Uninvaded

By DR. FRANK THONE

LIGHTNING, most awesome of the spectacular forces of nature, has yielded some of its mystery to science. But not all. We no longer credit it, as did our ancestors, to an angry Zeus or an impetuous Thor. Since Ben Franklin flew his adventurous kites, nearly two centuries ago, we know it is "made of electricity." We have some idea how it prepares its path through the air. We have found out what almost infinitesimal fraction of a split second it takes for its leap. We guess (though crudely) at the amount of energy in a flash.

But we do not know with certainty what makes its light. We can only infer why it causes thunder. And we are as helpless as were our most scared and benighted forebears at the job of predicting where it is going to strike next. Weather scientists who specialize in lightning can work for many years before they need sigh for more worlds to conquer.

The terrific power for destruction that rides in a lightning stroke was probably what impressed primitive man most and first. If lightning struck a man or an animal, he died instantly. If it fell in the forest, trees were blasted, and very likely a fire started. If it struck the ground, a stone could usually be found that nobody had noticed before—plainly the core of the destructive missile from on high.

So it easily came to pass that the principal god was always the lightning-wielder; Jupiter-Zeus, among the Romans and Greeks, Thor among the peoples of the North. Even Yahveh of the Semites is said to have been originally a weather-god; the attributes of majesty and mercy that made Him King above all gods and finally the sole God came through the inspiration of the patriarchs and prophets of that genius-race in religion, the Jews. And we still see the lightning flashing about Him on the summit of Sinai.

With this savor of the supernatural clinging to lightning through the ages, it is not at all remarkable that real

knowledge about the fire in the heavens is almost altogether modern knowledge. Nor is it remarkable that fragments of the old religious awe still survive, furiously, as superstitions. "Thunderstones" are still sent to museums by sincere but mistaken believers in their genuineness. Village atheists still climax tirades by challenging God to destroy them with a stroke of lightning (atheists are usually extremely superstitious). There are still people who believe a marriage will not turn out well if it thunders on the wedding day.

Lightning Superstition

Curiously enough, too, there are lightning superstitions that sprout not from half-forgotten religious sources but from half-understood science. There are nervous women who put the legs of a chair or a table in glass tumblers or bowls and roost cowering on this supposedly insulated perch during a thunderstorm. There are plenty of persons of both sexes who think that "lightning follows a draft" and will not have an open window in the house so long as there are flashes in the sky. And the idea that thunder sours milk seems to be as robustly flourishing as though milk bacilli had never been discovered.

The best cure for superstition is a dose of plain fact. What is a flash of lightning, then; whence does it come and what does it do?

A flash of lightning is simply a big electric spark, leaping the gap between a positively charged body and a negatively charged one. When you stroke a cat until her fur crackles, you are making lightning on a minute scale. The physicist in the laboratory, turning the handle of a static electric machine until he gets a bigger spark that jumps with a loud snap, is also a small-scale lightning-wielder. It was just to prove this point that Franklin flew his kite into a thunderstorm and charged battery jars with electricity from the clouds.

But where do the clouds get their electrical charge? It is built up by the separation of positively and negatively charged particles. Everything carries an

electric charge, even the least dust particle in the air or the smallest raindrop. But most of the time positively and negatively charged particles are mixed in so nearly equal numbers that nothing happens.

But in the windy chaos of a thunderstorm's front, where masses of warm air are rising as violent vertical winds and other masses of cold air are descending with equal violence, a grand sorting-out of charged water-drops occurs. Small drops, bearing negative charges, are whirled aloft on the rising air currents: we get vivid evidence of that in the high-piled "thunderheads" that often form on a hot afternoon. Big drops, carrying positive charges, fall in spite of the up-blowing winds, and form the bottom of the cloud. Thus a thundercloud carries a massed negative charge at its top, a massed positive charge at its base. The ground underneath is usually negatively charged, so that there is a sort of electrical sandwich—positive charge between two negative ones.

Where opposite charges of static electricity exist, there is always a tendency for them to unite and end the state of tension that exists between them. When the charges are powerful enough to break down the insulating effect of the air, they leap the gap as a spark—and if the spark is long enough, it is a flash of lightning.

When we see lightning flash, it is so sudden as to seem outside of time—something done instantaneously. But that is not all there is to a flash of lightning. Before it can leap, there must be a path

EXPLORING the ATLANTIC'S GREATEST DEEP

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an address by

Dr. Paul Bartsch

Curator, U. S. National
Museum

To be given Friday, June 30, at 1:45 p. m. Eastern Standard Time over stations of the Columbia Broadcasting system. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

prepared for it. This is done by a kind of electric "feelers" sent out from both sides—silent, usually invisible electric discharge that loads a path through the air with sufficient electric charge to make it a conductor. In the language of the laboratory, the air is "ionized."

This path does not go in a straight line, as it theoretically might. This is because of uneven amounts of moisture in the air, influence of the wind, etc. Hence when the lightning discharge itself, suddenly leaps along the path, it makes an irregular streak of brilliance.

Path Not Angular

The path of a lightning flash, however, is not the geometrically regular series of sharp angles in which the older artists seemed to delight. It is as crooked as the course of a brook, or the root of a tree. Indeed, branching streaks of lightning do bear a most startling resemblance to root systems, sometimes.

Lightning does not always leap from the cloud to the earth. Many, probably most, lightning discharges occur between cloud and cloud, or even between the top and the bottom of the same cloud. A horizontal, cloud-to-cloud lightning stroke may travel as much as twenty miles. Vertical flashes, from cloud to earth, are seldom as much as a mile in length.

While lightning will occasionally strike the level earth, usually its target is some projecting object—a house, or a tree, or a transmission line tower. This is because the path-preparing brush discharge is more likely to start from a projection than from a level surface.

By the same rule, therefore, the neighborhood of anything prominently projecting is dangerous during a thunderstorm. It is a great temptation to take shelter from the pelting rain under a big tree, but that is the thing most likely to "draw lightning." If you are in the woods, keep away from the tall trees and near the low ones, when the storm breaks. If you are in the fields, and lightning begins to pelt the earth around you, lie down. Then you'll have as much chance at least as the worms and toads and other humble things. If you stand up proudly and assert yourself like Ajax, you're offering a nice little projection for the start of one of these lightning-coaxers, a brush discharge. Ajax may have appealed to Homer, but to a modern meteorologist he was just a darn fool taking an awful chance. He got away with it, so he lives in literature

as a hero—albeit a somewhat stupid one.

Indoors, you are safest in a steel-frame building, if the frame is well grounded. Next to that, in safety, is any kind of a building really thoroughly equipped with lightning rods. But most "protected" buildings don't have the job done half well enough. According to Prof. W. J. Humphreys of the U. S. Weather Bureau, there should be a rod, preferably six feet high, on every chimney, gable-end, and other projection. The conductors should be solidly connected with each other and with all plumbing and piping in the house, and should finally be grounded deep in perpetually moist earth. This sort of an arrangement, he says, will not insure against all damage, but it will make a house much safer than one with no rods or with rods carelessly or inadequately installed.

How hard lightning strikes when it does score a hit is shown graphically by a crushed hollow copper lightning rod which Prof. Humphreys has studied. One stroke of lightning did for it, collapsing it completely except for a joint where it was solid for a few inches, and melting its tip off. Prof. Humphreys estimates that roughly 100,000 amperes of electricity dumped itself through this rod in a small fraction of a second.

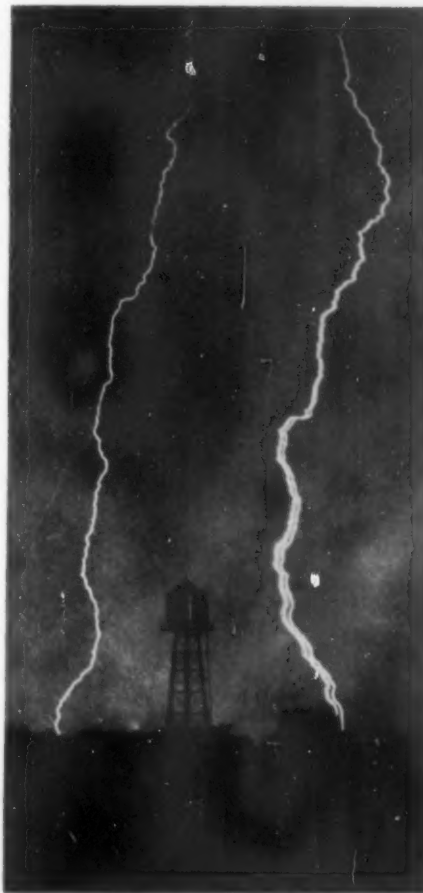
How small a fraction of a second a flash of lightning lasts was for long an unsolved riddle. However, several methods of getting an estimate, most of them involving the use of special cameras, have been used with apparently satisfactory results. Possibly the closest measurement of lightning time was made by Dr. C. V. Boys, noted English physicist, during a visit to this country some time ago. His calculations of one flash he caught with a camera fitted with two revolving lenses indicate a total travel time for the flash of one seven-thousandth of a second. So "quick as a flash" is really pretty quick.

Starts at Ends

An interesting by-product of Dr. Boys' clocking of the lightning was the discovery that the flash started from both cloud and ground at the same instant, uniting in the middle of the path.

What causes the blinding white light of lightning is still pretty much an unsolved riddle. It can hardly be entirely due to the heating of the air, Prof. Humphreys thinks. More likely, he suggests, it is an atomic "excitation" phenomenon, similar to what we see in the glowing Neon-tube signs in the streets.

Lightning is not always of the same



MULTIPLE TRACK

The right-hand flash shows clearly how lightning may strike several times along the same path through the air.

color. Some flashes are white or blue-white, others reddish, and sometimes yellow flashes are seen. The white and blue-white flashes, Prof. Humphreys explains, are caused by lightning striking through a rain-filled atmosphere; the light is largely that of glowing hydrogen. The rose-colored flashes are made by lightning striking through dry air. In these, the light is due mostly to nitrogen. The yellow flashes are really white ones, but at such a distance that part of the colors are filtered out of the light before we see it.

The real lightning is always of the "streak" variety. So-called "sheet" and "heat" lightning are simply reflection effects.

The cause of thunder is most plausibly explained by the sudden expansion of the atmosphere along the course of the flash, due to the brief but intense heat. It is in the same category as the sound of a big gun, but it lasts longer because the sound takes some time to travel to us from the more remote parts

of the flash; and the effect is aggravated by the crookedness of its path.

It is easy to tell how far away a lightning-flash started, by listening for the first thunder-sound. As soon as you see the flash start counting, somewhat deliberately, "One hippopotamus, two hippopotamus, three hippopotamus. . . etc." It takes about one second to say "One hippopotamus." Sound travels about a thousand feet a second. Allow a mile for every five hippopotamuses.

PICTURE ON THE COVER—Black lightning, which appears in some photographs but is never observed visually, is not really dark. The black streaks are the weaker flashes that have a brightness value so low, in contrast to the brightly illuminated background, that they appear dark by comparison.

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Science News Letter, June 24, 1933

CRIMINOLOGY—PHYSIOLOGY

Real Detective Stories Told in Medical Exhibit

SOLUTIONS of dozens of real life detective stories were exhibited at the meeting in Milwaukee of the American Medical Association.

Two slender vials, for instance, contain the sleeping medicine found in the organs of Starr Faithful, New York society girl who mysteriously disappeared from an ocean liner. When her body was found in the water, the condition of the heart showed death by drowning, but discovery of the sleeping medicine, veronal, in all the organs showed that she must have been in deep sleep when her body reached the water and that she could not have jumped in.

Nearby are pictures and diagrams of gunshot wounds. From the condition of the edges of the skin and from the size of the entering and exit holes of the bullet much can be told of how and from where the shot was fired.

A picture of the charred remains of a torch murder victim and pictures of the teeth and jawbones by which the victim was identified are to be seen. Exact description of the teeth was sent by the police to thirty thousand dentists, from which identification was made.

But the purpose of the exhibit is not to make a chamber of horrors display, although that is the effect. Instead it is to call attention to the value of trained medical examiners in place of coroners for determining the causes of accidental or sudden deaths.

Science News Letter, June 24, 1933

ENTOMOLOGY

Grasshopper and Locust Plague Declared Largely Man-Made

MAN HAS himself to thank for plagues of grasshoppers and their next of kin, the locusts. An international scientific accord on this point was reached at the Fifth Pacific Science Congress in Vancouver, B. C., by Dr. J. R. Parker of the U. S. Department of Agriculture, and Dr. B. P. Uvarov, of the Imperial Institute of Entomology, South Kensington, England.

Dr. Parker, discussing conditions in the grasshopper areas of North America, gave it as his opinion that the cultivation of crops of lush vegetation alongside of unplowed roadside and fencerow strips that offer ideal hatching grounds for grasshoppers tends to make these insects more numerous than they were in the days of unbroken sod, before agriculture came. We must therefore calculate upon grasshoppers as a perennial pest, he said, and adjust our farm practice and methods of anti-insect warfare accordingly.

Dr. Uvarov was concerned primarily with the locust problem in Asia and the adjacent island areas. China, he said,

offers the greatest menace on the mainland: an intensively cultivated agricultural country where coordinated scientific control of the insects is not yet a possibility.

The Philippines and the East Indies, he said, present a challenge to the Western powers that control them to unite in an international effort to end the locust menace, as several of the European powers already have united to fight the insects in the Occident and the Near East. The introduction of semi-Europeanized farming methods in the various island groups has resulted in a shifting agriculture, leaving abandoned fields as breeding grounds for locusts, which subsequently rise in migrating swarms and often cross considerable stretches of sea to fall on other islands under the jurisdiction of other powers. Dr. Uvarov pointed out a special responsibility of the United States in this connection, since the Philippines are under suspicion as particularly prolific breeding grounds of migratory locusts.

Science News Letter, June 24, 1933

BACTERIOLOGY

Cause of Fatal Disease In Young Lambs Discovered

DURING the California lambing season, a disease hitherto of unknown origin inflicts heavy losses upon newly-born lambs on farms that are widely separated.

Dr. Hilda Hempl Heller of the Hooper Foundation for Medical Research of the University of California, has fastened the apparent guilt of causing this disease upon one kind of the very common colon bacilli, the sort of germ widely found in the intestinal tract of animals.

An unusual circumstance of this disease is that, though it is an infection, the mechanism of its action resembles that of a food poisoning. The little lamb, just after being born, drinks its mother's milk, which is not poisonous. When in some way it is infected with

the colon bacillus at a virulent stage, the germs form a poison in the milk within the lamb's alimentary tract. The lamb dies from absorbed poison rather than from the direct attack of the germs.

The germs charged by Dr. Heller with causing the disease are extremely variable and they have been found to change their deadliness rapidly.

Dr. Heller, who is an authority on botulinus poisoning, began work on the disease because it was thought that it was a disease caused by an anaerobe, or air-hating germ. She found that a powerful poison was present in the lamb's intestines, of which five drops would kill a mouse in two and one-half hours. The blame for forming this poison could not be fastened upon any anaerobe.

The poison-producing power of the

colon bacilli found in the lambs was then demonstrated by Dr. Heller. When grown in test tubes the isolated germs produced a poison identical in effect with that obtained from the lambs. Dr. Heller, who worked on this problem with the cooperation of the University of California's Division of Veterinary Science, located at Davis, California, did not have the opportunity to clinch the proof by infecting lambs, because when the presumably guilty organism was

isolated and proved rapidly fatal for guineapigs, the lambing season was over.

Dr. Heller hopes to be able to continue research upon this lamb disease. It seems probable that it is widespread in the sheep raising areas of this and other countries, and must cause a loss amounting to many thousands of dollars annually. It may also be related to a similar disease of calves which is responsible for even larger financial losses.

Science News Letter, June 24, 1933

PHYSIOLOGY

Bone Age Gives Index To Mental and Emotional State

BONE development is now being used as a guide in treating certain children who are mentally retarded or emotionally unstable, physicians gathered in Milwaukee for national medical meetings were told. Dr. E. Kost Shelton of Santa Barbara, Calif., has found the stage of bone development, or bone age, a good index to the speed with which certain vital transformations are going on in the body, he reported to the Association for the Study of Internal Secretions.

These transformations are the processes by which energy for the body's activities is obtained from the burning of food and oxygen. When these processes, called metabolism, proceed at either too fast or too slow a rate, the health is seriously affected.

The bone age, which can be determined by X-ray examination, is correlated with the metabolic rate, and can be used as a guide in treatment of certain types of disordered metabolism, Dr. Shelton found.

Metabolic Speed Indicated

"Any metabolic disorder in childhood, when sufficiently severe to produce mental or emotional symptoms, will be reflected in bone development," he gave as his opinion. He believes that the rate of bone development is determined by the metabolic speed and therefore is the best guide to the latter.

Dr. Shelton described a number of patients suffering from retarded growth and defective mental development, in whom he also found very much retarded bone growth. Treatment with extract from the thyroid gland, which speeds up the rate of metabolism, improved

markedly the condition of the patients. Not only did they improve mentally but the change was reflected in the bones, which reached the normal stage for the patients' ages and in some cases the body height increased. Additions of vitamins A and D and feeding an otherwise adequate diet had no effect on metabolic speed or the development age.

Science News Letter, June 24, 1933

CHEMISTRY

New Ship Fumigant Safer Than Hydrocyanic Acid

CARBOXIDE gas, a mixture of nine parts of carbon dioxide and one part of ethylene oxide, has been found an effective fumigant to rid ships of cockroaches and other insect vermin, without the serious danger to human life that has always attended the use of hydrocyanic acid, now the standard gas for this purpose. The experiments establishing the value of the carboxide mixture have been conducted by the Bureau of Medicine and Surgery of the U. S. Navy.

The carbon dioxide in the mixture removes the fire hazard that would go with unmixed ethylene oxide, and at the same time practically doubles its toxicity for insects. Carboxide has been found effective in comparatively small dosages, making it economically practicable for conveniently short periods of exposure.

A detailed report on the experiments will appear in the July number of the U. S. Naval Medical Bulletin.

Science News Letter, June 24, 1933

GENERAL SCIENCE

Dr. Isaiah Bowman Elected Research Council Chairman

DR. ISAIAH BOWMAN, director of the American Geographical Society of New York, has been elected chairman of the National Research Council which has headquarters in Washington. He succeeds Dr. W. H. Howell, the physiologist who has served as the chief administrative officer of the council for the past year. Dr. Bowman will remain director of the American Geographical Society and will devote half of his time to the National Research Council. He will perform the functions exercised by Dr. Vernon Kellogg as permanent secretary until his resignation and election as secretary emeritus last year.

Dr. Howell, formerly director of the Johns Hopkins School of Hygiene and Public Health at Baltimore, was drafted for a year as chairman during a reorganization of the National Research Council.

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cil. He plans to return to research work in physiology, a field of endeavor that has won him international honors. Dr. Howell will continue as chairman of the executive committee of Science Service.

As a geographer, Dr. Bowman has conducted researches in various parts of the world and he was recently elected president of the International Geographical Congress. Under his guidance the American Geographical Society has greatly promoted fundamental research in geography and cartography.

Adding to his many other honors, Dr. William H. Welch of the Johns Hopkins University, known as the "dean of American medicine" has been elected honorary vice-chairman of the National Research Council, an office that has just been created.

Science News Letter, June 24, 1933

PUBLIC HEALTH

Long Preparation Planned For Future Specialists

IMPORTANT to the public needing special treatment for diseases of the nose and throat, the eyes, or other parts of the body are plans discussed at the meeting of the American Medical Association in Milwaukee for regulating more closely the practice of the special branches of medicine. In the future, a physician will not be able to set himself up as a specialist on his own statement. Instead he will be required to take special training for several years and to pass examinations in order to qualify as a specialist, if the plans now under discussion are carried out.

Science News Letter, June 24, 1933

THE METROPOLITAN MUSEUM OF ART

Ultra-Violet Rays

By James J. Rorimer

\$2.00 in paper; \$2.50 in cloth

The Restoration of Ancient Bronzes

By Colin G. Fink and Charles H. Eldridge

50 cents

The Decoration of the Tomb of Per-nēb

By Caroline Ransom Williams

\$8.00

For a list of all the publications of the Museum, write to The Secretary, Fifth Avenue and 82nd Street, New York, New York.

BIOCHEMISTRY

Sea Water Nitrates Increased By Unknown "Something"

THERE seems to be something in sea water, something that may not be alive, which nevertheless can change ammonia into nitrate when sunlight shines upon it.

This discovery, highly important in its bearing on the understanding of both "pure" marine biology and such practical applications as fisheries problems, is announced in *Science* by C. E. ZoBell of the Scripps Institution of Oceanography.

Nitrates are necessary for the growth of plants, both in the sea and on land. On land, there are groups of soil bacteria that attend to the conversion of other nitrogen-containing compounds into nitrates, making them available for plant use. But such bacteria have never been found in the sea, and when Mr. ZoBell checked up on the work of previous investigators he also was unable to demonstrate their existence. Even when he purposely planted nitrifying bacteria in sea water and gave them the most favorable food and temperature conditions, they all died. There remains, of course, the possibility that there are other kinds of nitrifying bacteria in the sea that have not yet been detected; but this is necessarily only a conjecture.

Yet the nitrifying process goes on in

the sea. Mr. ZoBell was able to prove, by chemical tests, that sea water changed ammonium salts into nitrates when sunlight shown upon it, though it did not do so in the dark. Passed through a fine-pored filter to strain out all bacteria, sea water still possessed this nitrifying power under sunlight. But sea water heated in an autoclave under steam pressure no longer formed nitrates. Neither did artificial sea water, synthesized out of distilled water and appropriate quantities of various salts.

Exposure to radiation from a mercury arc, rich in ultraviolet rays, speeded up the nitrifying power of sea water very much. Under such radiation as much ammonium was changed into nitrate in two hours as could be produced in two weeks under natural sunlight.

What is the mysterious stuff in sea water that does the work of nitrifying bacteria for the plants of the sea? Mr. ZoBell does not say. But he is continuing his researches.

Science News Letter, June 24, 1933

A kind of slate called basanite is the "touchstone" used to test the purity of gold: the amount of alloy is shown by rubbing the metal against the basanite and noting the color on the stone.

POPULATION

Native White Birthrate Now Constant in Parts of Country

THE DECLINE in the number of children borne by native white women of the United States, which has so concerned those interested in population trends, seems to have struck bottom in some sections of the country.

In northern New England and rural New York the ratio of children to married native white women of child-bearing age has remained practically constant during the past thirty years, even after allowance is made statistically for those classified as "native" who are of foreign or mixed parentage. And this constant ratio is contrasted with a sharp decline

in child-bearing or "natality" in most parts of the country. The most rapid decline in recent years has occurred in the South and Rocky Mountain states where birth rates are still very high.

These facts and the suggestion that the native-white population of the United States seems to be reaching a fair degree of stabilization are contained in a report by Dr. Frank Lorimer, of the Eugenics Research Association. This report will appear in full in the July issue of the Milbank Memorial Fund *Quarterly Bulletin*.

Science News Letter, June 24, 1933

NATURE RAMBLINGS by Frank Thone

BOTANY



Breadfruit's Cousin

O SAGE ORANGE, that terrifically thorny shrub that in the days before barbed wire hedged in nearly every farm in the Midwest, is botanically a next-door neighbor to the Polynesian's tree-borne manna, the breadfruit. The similarity can be noted if one is able to get a preserved specimen of the breadfruit and compare it with the fruit of the Osage orange; there is the same exterior roughness, which upon splitting open discloses itself as due to the innumerable splinter-shaped segments of which the fruit is built up.

But let no one presume on this evident similarity in structure by taking for granted a similarity in edibility! The Osage orange is exceedingly bitter, and is reputed to be poisonous. Its odor alone is enough to give some persons a headache. Not without reason does it bear a second common name; mock orange.

The shrub got its name, quite probably, from the fact that its center of distribution in the Ozark Mountains was in the general region occupied by the Osage Indians. The "orange" appellation arises easily enough out of its superficial resemblance to a rough-skinned orange, though the plant is not at all nearly related to the citrus fruits. In the days of its rural usefulness it became widely known as Osage hedge, and indeed in many country regions simply as "hedge."

In the heyday of its employment as guardian of field boundaries the Osage orange was planted literally by the mile, and rural swains taking their best girls out for a buggy ride in the 'eighties and 'nineties found the high hedges welcome screens from over-curious observation.

But like many other useful institutions, the Osage hedge has been superseded. It was a gross feeder, and made profitable cultivation impossible on a strip fifteen or twenty feet wide on either side of the hedge. Besides, it was forever growing up to almost tree height, necessitating a laborious chopping down. So when barbed wire became cheap the farmers had their hundreds of rods of Osage hedge rooted up and replaced them with the thrifter though less picturesque fence. Today there are relatively few Osage hedges left.

Yet the Osage orange, like a good loser, was able to do its supplanter a good turn. For where it had been allowed to grow up into a small tree, as it will if not kept cropped, it produced post-wood of iron-like durability for the support of the barbed-wire fence.

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CHEMISTRY

Intense Audible Sounds Cause Chemical Changes

SOUNDS can cause chemical changes of many different kinds if only the sounds are intense enough. This was reported before an audience of chemists at the meeting of the American Association for the Advancement of Science in Chicago, by Dr. Earl W. Florsdorf and Dr. Leslie A. Chambers of the University of Pennsylvania School of Medicine.

Most of the sounds used were shrill as well as intense, but one type of apparatus produced a sound of only moderately high pitch, two octaves above middle C of the piano. The sounds, projected into liquid media, coagulated proteins, broke down ethyl acetate to produce acetic acid, cracked vegetable oils with the generation of acetylene gas, and to a slight extent decomposed starch to produce glucose.

A spectacular demonstration was the apparent soft boiling of an egg subjected to the effects of the intense sound for a few minutes, without any raising of the temperature.

All the changes take place quickly, some of them in a fraction of a second, so that the nature of the action causing them is an interesting problem to chemists. Drs. Florsdorf and Chambers believe them to be due to a momentary kinetic, or speeding-up, effect on the molecules involved, affecting them in much the same manner as heating.

The first indication that sound or

sound-like vibrations could effect chemical and biological changes was obtained by Prof. R. W. Wood of the Johns Hopkins University and Alfred L. Loomis, working at the latter's private laboratory at Tuxedo Park, N. Y. The vibrations they used were far above audible pitch, in what is called the "super-sonic" range. The pioneers in the discovery that audible sounds could have similar effects were Prof. O. B. Williams of the University of Texas and Prof. Newton Gaines of Texas Christian University.

Science News Letter, June 24, 1933

ICHTHYOLOGY

Catfish Know When Quake Is Coming

CATFISH know when an earthquake is due, two Japanese scientists, Dr. Shinkishi Hatai and Dr. Noboru Abe, have discovered. Usually the most placid of fish, they become very nervous and "jumpy" about six hours before the shock occurs.

Drs. Hatai and Abe are seismologists. They had noticed that catfish in pools were unusually susceptible to slight stimuli just before earthquakes registered themselves on their instruments. This led them to make definite experiments on the fish.

Three times a day they tested fish in an aquarium by tapping the supporting table with a finger or knuckle. They found that when no earthquake was impending the catfish moved very lazily or not at all. But about six hours before a shock the fish would jump when the table was tapped, and sometimes would swim about agitatedly for a time before settling down again on the bottom.

After a period of several months it was found that the catfish had been correct in 80 per cent. of their earthquake predictions, covering the occurrence of 178 quakes of all degrees of severity. Unfortunately, however, they seemed to be quite unable to discriminate between slight local shocks and strong earthquakes occurring at a distance; they were just as "jumpy" before little quakes as before big ones.

The Japanese seismologists conjecture that their catfish are made sensitive before earthquake shocks through some electrical changes in the earth. They believe this because only when the aquarium was kept electrically grounded, through the drain pipe, could the fish be sensitized when an earthquake was approaching.

Science News Letter, June 24, 1933

• First Glances at New Books

Electrochemistry

SPARKS FROM THE ELECTRODE—C. L. Mantell—*Williams & Wilkins*, 127 p., \$1. The industries born of the union of electricity and chemistry have their stories told. The development of electro-chemistry has occurred with such a rush, with such intense industrial application and such benefits to civilization, that this volume in the Century of Progress Series will be welcomed by those who wish the background and information on electro-chemical developments and prospects.

Science News Letter, June 24, 1933

General Science

MAJOR MYSTERIES OF SCIENCE—H. Gordon Garbedian—*Covici Friede*, 355 p., \$3.75. In the various fields of science there are many problems which have not been solved. Mr. Garbedian discusses twenty-seven of these in as many chapters, making a book which is a useful popular guide to future achievements in science.

Science News Letter, June 24, 1933

Physics

THE ELEMENTS OF THE NEW QUANTUM MECHANICS—Otto Halpern and Hans Thirring, translated by Henry L. Brose—*Dutton*, 215 p., \$3.25. A welcome detailed treatment of the new quantum mechanics conveniently divided into the development up to 1926, the further development since then and the achievements of the theory.

Science News Letter, June 24, 1933

Chemistry

PRINCIPLES OF GENERAL CHEMISTRY—Stuart R. Brinkley—*Macmillan*, 585 p., \$3.50. A revised edition of a textbook intended primarily to meet the requirements of a general college for students who have had a preparatory course in chemistry.

Science News Letter, June 24, 1933

History of Science

THE HEROIC AGE OF SCIENCE—William Arthur Heidel—*Williams & Wilkins*, 203 p., \$2.50. In this Carnegie Institution of Washington publication, the research professor of the Greek language and literature in Wesleyan University, presents a study upon the conception, ideals and methods of science among the ancient Greeks. He traces the original connection of Greek science with magic and religion and then scrutinizes the methods of Greek science

considering observation, induction, classification, analogy and experimentation. Interesting is his conclusion that "what distinguishes the best scientific procedure of modern times is chiefly the refinement of technique."

Science News Letter, June 24, 1933

Economic Botany

PLANTS USEFUL TO MAN—W. W. Robbins and Francis Ramaley—*Blakiston's*, 428 p., \$3. There has long been a need for just this book: a compact but complete, botanically correct but popular readable work on the origin, present distribution and uses of the principal food, drug and ornamental plants. If your five-foot shelf of botanical reference works is already filled, extend it one inch to make room for Robbins and Ramaley.

Science News Letter, June 24, 1933

Astronomy

ASTRONOMICAL ATLASES, MAPS AND CHARTS—Basil Brown—*Frederick Warne & Co.*, 200 p., \$5. In beautiful format and with splendid reproductions of illustrations from early astronomical publications, this volume constitutes a guide to literature and rare books, atlases, charts, catalogues, globes, zodiacs and planispheres of the early days of astronomy.

Science News Letter, June 24, 1933

Biography

WALLACE CLEMENT SABINE—William Dana Orcutt—*Plimpton Press*, 376 p., \$5. The biography of a great American scientist whose contributions to acoustics are classic.

Science News Letter, June 24, 1933

Mathematics

HANDBOOK OF MATHEMATICAL TABLES AND FORMULAS—Compiled by Richard Stevens Burington—*Handbook Publishers*, 251 p., \$2.

Science News Letter, June 24, 1933

Zoology

TEXTBOOK OF GENERAL ZOOLOGY—Winterton C. Curtis and Mary J. Guthrie—*Wiley*, 588 p., \$3.75. A second edition of a successful textbook.

Science News Letter, June 24, 1933

Anthropology

THE RACES OF MANKIND—Henry Field—*Field Museum of Natural History*, 40 p., 9 pl., 25c. Brief descriptions of races portrayed in sculpture in the new Chauncey Keep Memorial Hall at the Field Museum. The nine photo-gravure plates show some of the finest of the sculptures, which are by Malvina Hoffman. Sir Arthur Keith has written a critical appreciation of the collection, which makes an attractive introduction to the pamphlet.

Science News Letter, June 24, 1933

Chemistry

INDUSTRIAL CHEMISTRY—William Thornton Read—*John Wiley*, 576 p., \$5. There is presented in this book, intended for use as a college text and a reference source for business men, a picture of modern industries from the standpoint of chemical compounds and changes, chemical engineering operations, sources of raw materials, uses of products and economic relationships. The author is dean of the School of Chemistry at Rutgers University.

Science News Letter, June 24, 1933

General Science

UNIVERSITY STUDIES: CAMBRIDGE 1933—Edited by Harold Wright—*Ivor Nicholson and Watson, London*, 294 p., 10 s 6 d. Nine essays by leaders among the younger graduates of Cambridge, summing up what is being done at their university in the sciences and the liberal arts.

Science News Letter, June 24, 1933

Biology-Philosophy

THE GREAT ENIGMA—H. H. Schauinsland, transl. by W. H. Schauinsland—*Dutton*, 93 p., \$1.25. A German biologist looks anew at the "unexplainable residuum" left by all mechanistic explanations of life, and ends by frankly embracing mysticism.

Science News Letter, June 24, 1933

Mathematics

PLANE GEOMETRY—Frank M. Morgan, John A. Foberg, W. E. Breckenridge, edited by John Wesley Young—*Houghton Mifflin*, 436 p., \$1.40.

Science News Letter, June 24, 1933

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